



Florida Power & Light Company, 6501 S. Ocean Drive, Jensen Beach, FL 34957

December 16, 2010

L-2010-300
10 CFR 50.73

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Re: St. Lucie Unit 1
Docket No. 50-335
Reportable Event: 2010-001-01
Date of Event: February 04, 2010

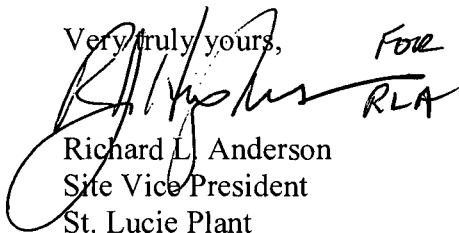
Air Intrusion from 1A Containment Instrument Air Compressor into Unit 1 Component Cooling Water (CCW) System - Supplement

The attached Licensee Event Report (LER) 2010-001-01 supplement is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(i)(B) and pursuant to 10 CFR 50.73(a)(2)(v)(D). Added or revised text is marked with revision bars.

This supplement supersedes in its entirety the previously submitted LER 2010-001 by Florida Power & Light (FPL) letter L-2010-056, dated April 5, 2010.

If there are any questions, please call Eric Katzman, Licensing Manager, at (772) 467-7734.

Very truly yours,

 *FOR*
RLA
Richard L. Anderson
Site Vice President
St. Lucie Plant

RLA/dlc

Attachment

IE22
NRR

LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME St. Lucie Unit 1	2. DOCKET NUMBER 05000335	3. PAGE 1 OF 4
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4. TITLE
Air Intrusion From 1A Containment Instrument Air Compressor Into Unit 1 Component Cooling Water (CCW) System

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
02	04	2010	2010	- 001 - 01		12	16	2010		

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)									
10. POWER LEVEL 100%	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input checked="" type="checkbox"/> 50.73(a)(2)(vii)						
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input checked="" type="checkbox"/> 50.73(a)(2)(iii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)						
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)						
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)						
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)						
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)						
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER							
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A							

12. LICENSEE CONTACT FOR THIS LER

NAME Donald L. Cecchetti - Licensing Engineer	TELEPHONE NUMBER (Include Area Code) 772-467-7155
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	CC	CCL	X999	YES					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On February 4, 2010, St. Lucie Unit 1 was operating in Mode 1 at 100% power when the Onsite Review Group (ORG) concluded that an air intrusion event on October 16, 2008, involving the containment instrument air system resulted in the CCW system becoming inoperable.

Evaluation of the CCW system indicated that Operators detected and eliminated the source of the air ingress with no significant system impact during normal power operation. An evaluation of the system under design basis accident conditions determined that the CCW system was in an unanalyzed condition that could have prevented the fulfillment of a safety function and rendered the CCW system inoperable. In accordance with 10 CFR 50.73(a)(2)(ii)(B), 10 CFR 50.73(a)(2)(v)(D), 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(vii) this event requires notification of the NRC via a License Event Report (LER).

The root causes for this event concluded that organization and programmatic weaknesses existed in the areas of prompt identification, understanding of event significance, timely corrective actions and original design gaps of the containment instrument air compressor system. Corrective actions include plant hardware modifications, procedure revisions and training.

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NARRATIVE**Description of the Event**

On October 16, 2008, while Unit 1 was in Mode 1, the CCW system [EIIS:CCL] experienced air intrusion from a containment instrument air compressor [EIIS:CMP]. At the time, operators detected and eliminated the source of the problem with no significant impact during normal plant operation. During this period the CCW system was in an indeterminate operability condition and both trains of CCW should have been declared inoperable and T.S. 3.0.3 entered. Further, Engineering concluded that the amount of air intrusion into the CCW system was an unanalyzed condition and a review of operating alignments indicated that had the design basis accident of a loss of coolant accident (LOCA) concurrent with a loss of offsite power (LOOP) occurred, both trains of CCW could have become inoperable.

Cause of the Event

There were six (6) root causes associated with the event: 1) The organization failed to demonstrate a commitment to achieving a high level of human performance with nuclear safety as the overriding priority; 2) The organization missed several opportunities to promptly identify, fully analyze and resolve in a timely manner the Unit 1 CCW air intrusion events; 3) Inadequate fleet/site procedures resulted in the failure to recognize the condition and the significance of CCW air intrusion in a timely manner; 4) Management did not effectively implement site and fleet policies and procedures; 5) Less than adequate design of the Containment Instrument Air Compressor System resulted in recurrent CCW air intrusion events; and 6) Less than adequate maintenance related to configuration control, initiated the second Unit 1 CCW system air intrusion event in November 2009.

The original CCW design was vulnerable to gas intrusion that could have resulted in a common mode system failure. Gas intrusion was not typically considered with respect to CCW design at the time that St. Lucie Unit 1 was designed as evidenced from its absence from licensing bases documents. Consequently, Unit 1 operating procedures did not provide instructions to detect and mitigate gas intrusion occurrences. The vulnerability to gas intrusion from the Unit 1 containment instrument air compressors was not recognized since the leakage path required the failure of an unloader valve on an idle instrument air compressor. In addition, design deficiencies associated with check and isolation valves in the leak path were not recognized.

Analysis of the Event

The Engineering evaluation of the CCW system indicated that operators detected and eliminated the source of the air ingress prior to the CCW system becoming incapable of supporting normal power operation. Although the conclusion indicates that during this air intrusion event, the CCW system was capable of supporting normal operation, the degree of air ingress resulted in an unanalyzed condition. If a design basis accident LOCA occurred, CCW system realignment would occur automatically. On receipt of the safety injection actuation signal (SIAS) the non-essential header would be isolated from the two separate and redundant essential headers. This would temporarily stop any further air ingress until Operators realigned the non-essential header to the one available CCW essential header to supply cooling to the reactor coolant pump (RCP) seals. The realignment is (assuming a single failure of one essential header) performed early in the emergency operating procedures and would re-initiate air ingress into the CCW system. Assuming operators did not isolate the air

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ingress source after realignment, this continuous air ingress into the CCW system would at some point result in the inoperability of this train of the CCW system.

During the actual event, CCW main header indicated flow became erratic with both high and low flow instrument swings around a small (~5%) base shift in flow and low flow alarms for the radiation monitors located immediately downstream of the CCW heat exchangers. While there are numerous points within the CCW system for which low flow alarms might have been received, no other flow alarms were logged from any other CCW system location. Evaluation of the CCW system indicated that operators detected and eliminated the source of the air ingress prior to the CCW system becoming incapable of supporting normal power operation. However; as stated above, subsequent realignment of the non-essential header would reintroduce air into the system and would have led to eventual CCW system failure.

Further evaluation by Engineering concluded that the CCW system had already ingested enough air and would have been inoperable during a postulated LOOP/LOCA event, even without the realignment of the non-essential header. Therefore, air intrusion resulting from this event resulted in an unanalyzed condition which could have prevented the fulfillment of a safety function. Consequently 10 CFR 50.73

(a)(2)(ii)(B), 10 CFR 50.73(a)(2)(v)(D), 10 CFR 50.73(a)(2)(vii), and 50.73 (a)(2)(i)(B) require notification of the NRC via a License Event Report (LER).

Analysis of Safety Significance

Air intrusion of the amount which occurred during the October 2008 event into the CCW system is an unanalyzed condition. Operators detected and eliminated the source of the air ingress prior to the CCW system becoming incapable of supporting normal power operation. A subsequent engineering evaluation concluded that this air ingress into the CCW system resulted in the inoperability of the Safety-Related function of both trains of CCW. Based upon a significance determination performed for this event, the dominant accident sequence is operators failing to stop the air intrusion prior to CCW failure followed by operators failing to trip the reactor coolant pumps (RCPs) upon a loss of CCW resulting in a RCP seal LOCA. Accordingly, the CCW air intrusion event is considered to have significant safety implications.

Corrective Actions

The corrective actions are tracked by the Site Correction Action Program (CAP). The corrective actions to prevent recurrence are as follows:

- 1) Implement training for licensed operators on the immediate operability determination (IODs) process;
- 2) Implement training on the Corrective Action Program;
- 3) Create St. Lucie site specific procedure for the Condition Identification and Screening Process, which includes qualification, performance measures and expectations for Corrective Action Program Coordinators (CAPCOs), Initial Screening Team (IST) and Management Review Committee (MRC) members;
- 4) Revise station Corrective Action Program Expectations Handbook procedure to include training, qualification, performance measures and expectations for corrective action coordinators (CAPCOs), Initial Screening Team (IST) and management review committee (MRC) members.

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- 5) Implement training for licensed operators and engineering personnel on Operational Decision Making process, impact of gas intrusion into safety-significant systems, information and actions on gas intrusion into systems from the NRC 95002 Inspection, impact of gas intrusion into safety-significant systems, and procedure/process changes made as a result of the root cause analysis.
- 6) Create St. Lucie site specific procedure for Condition Identification and Screening Process and revise Corrective Action Program Expectations Handbook to screen and classify CRs based on risk significance, and specify that station management is notified of high risk issues.
- 7) Revise the Fleet Operability Determination procedure to include procedural guidance for immediate operability determinations (IODs), significance of operability, and characterization of Risk to improve overall quality of CR Operability/Reportability Screenings.
- 8) Revise Unit 1 & 2 Component Cooling Water System Off-Normal Operating Procedures to add guidance for air intrusion events.
- 9) Revise High CCW Surge Tank Level Unit 1 & 2 Annunciator Response Procedures to add guidance for air intrusion events.
- 10) Implement the appropriate initial and continuing training on Corrective Action Program management alignment.
- 11) Implement a design change to abandon the containment instrument air compressor system, install a containment mini purge and use outside instrument air supply for containment.
- 12) Develop and implement a program to address potential failures of safety related (SR) and non-nuclear safety (NNS) systems, structures and component that could affect the design basis functions of safety related (SR) and risk significant (RS) systems.
- 13) Clarify configuration control expectations in the configuration management procedure for maintenance work activities to assure all alterations within a clearance are approved and documented.

Similar Events

This event is not considered a repeat event, however, a similar event subsequently occurred on September 9, 2009, and appropriate actions were taken to address operability. Numerous opportunities to learn from internal and external operating experience (OE) were missed so that the 2008 CCW air intrusion event was not prevented. Missed opportunities resulting from Industry operating experience have been added to lesson plans for Licensed Operator and Non-Licensed Operator Initial and Continuing Training.

Failed Component

SE1814A, solenoid Valve, Asco/Auto Switch Co. 8211C13